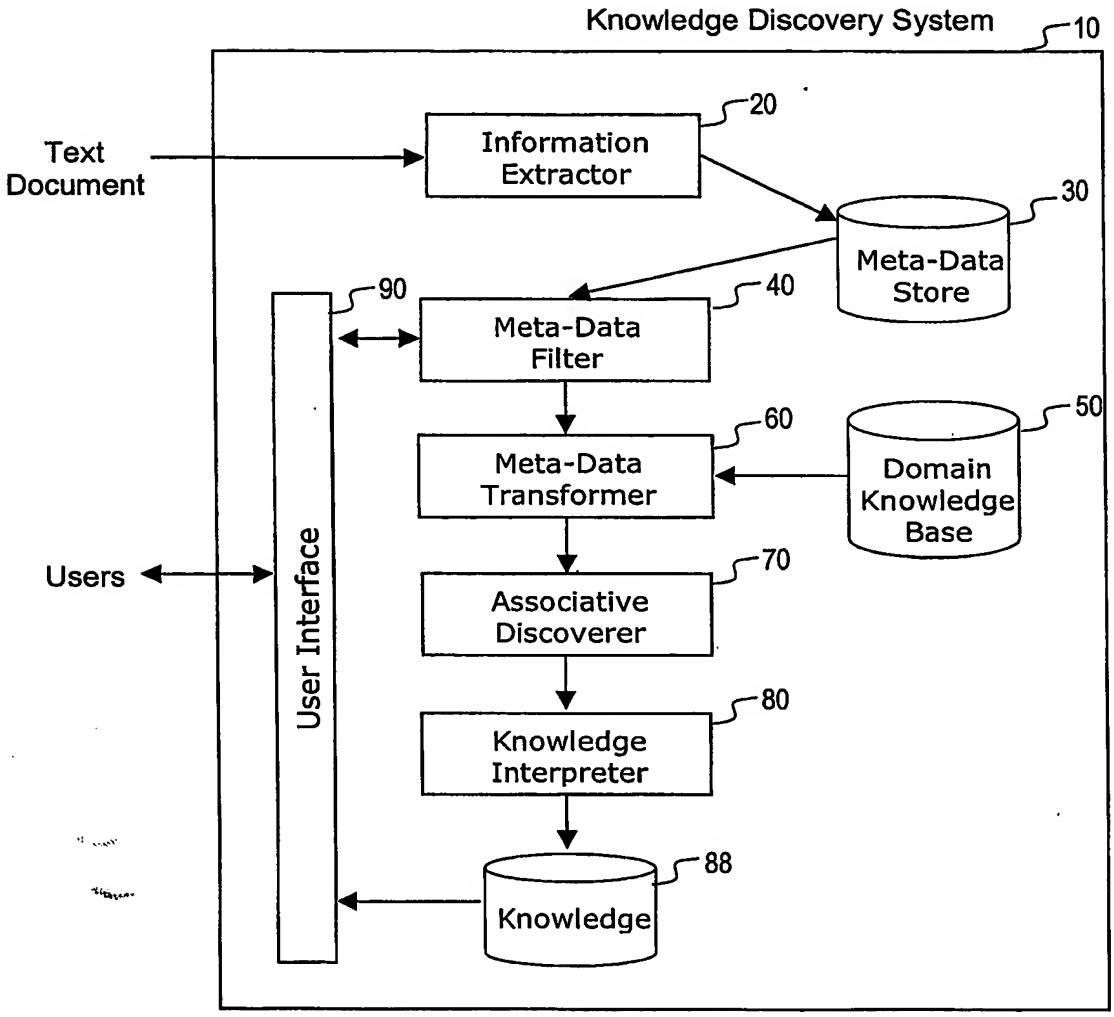

Knowledge Discovery System
10
Text Document
Information Extractor
20
Meta-Data Store
30
Meta-Data Filter
40
90
Meta-Data Transformer
60
Domain Knowledge Base
50
Users
User Interface
Associative Discoverer
70
Knowledge Interpreter
80
Knowledge
88

FIG. 1

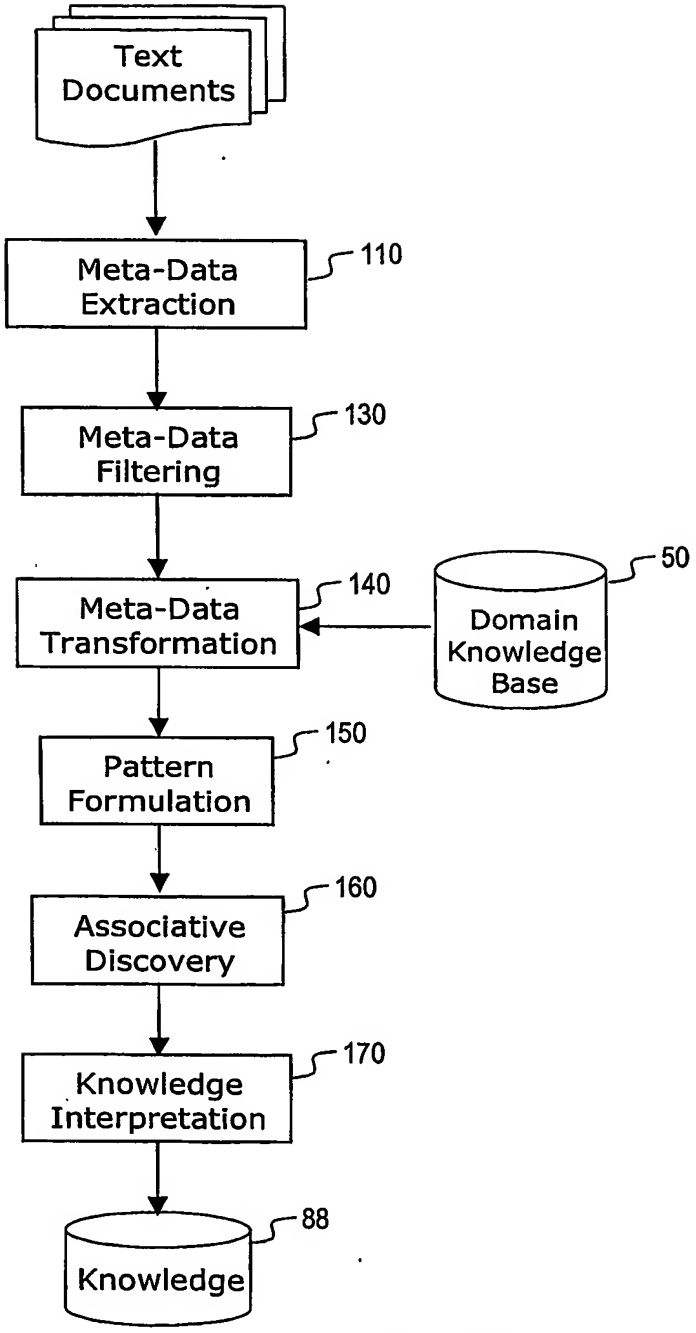
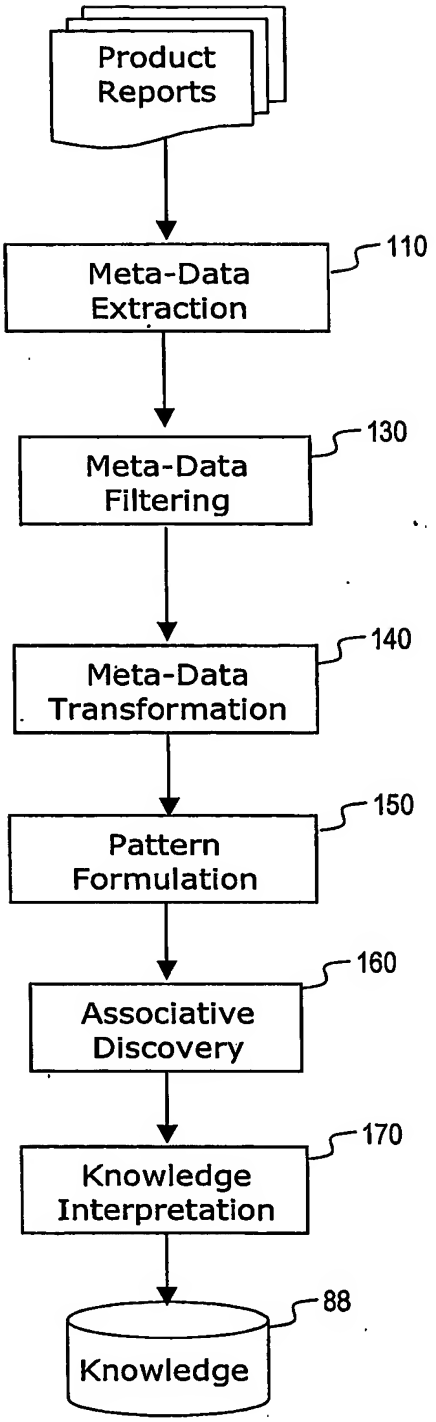

Text Documents
Meta-Data Extraction
110
Meta-Data Filtering
130
Meta-Data Transformation
140
Domain Knowledge Base
50
Pattern Formulation
150
Associative Discovery
160
Knowledge Interpretation
170
Knowledge
88

FIG. 2A



Product A is believed to be associated with cancer ...
...

(*Product A*, –>, *cancer*)
(*Product B*, –>, *cancer*)
(*Product B*, –>, *high blood pressure*)
(*Product C*, –>, *heart attack*)
...

(P_A, –>, *cancer*)
(P_B, –>, *cancer*)
...

Product to *Product Attributes*
P_A to $r_{A1}, r_{A2}, .., r_{AN}$
P_B to $r_{B1}, r_{B2}, .., r_{BN}$
...

$((r_{A1}, r_{A2}, .., r_{AN}), C)$
$((r_{B1}, r_{B2}, .., r_{BN}), C)$
...

E.g.,
manufacturer –> *Cancer*
$component_A$, $component_B$ –> *Cancer*
...

FIG. 2B

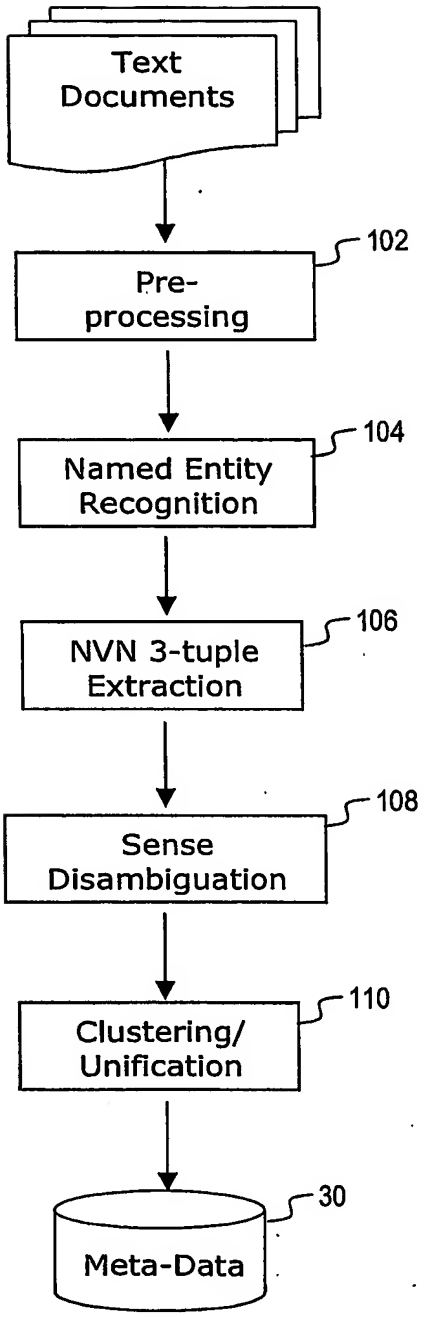

Text Documents
102
Pre-processing
104
Named Entity Recognition
106
NVN 3-tuple Extraction
108
Sense Disambiguation
110
Clustering/ Unification
30
Meta-Data

FIG. 3

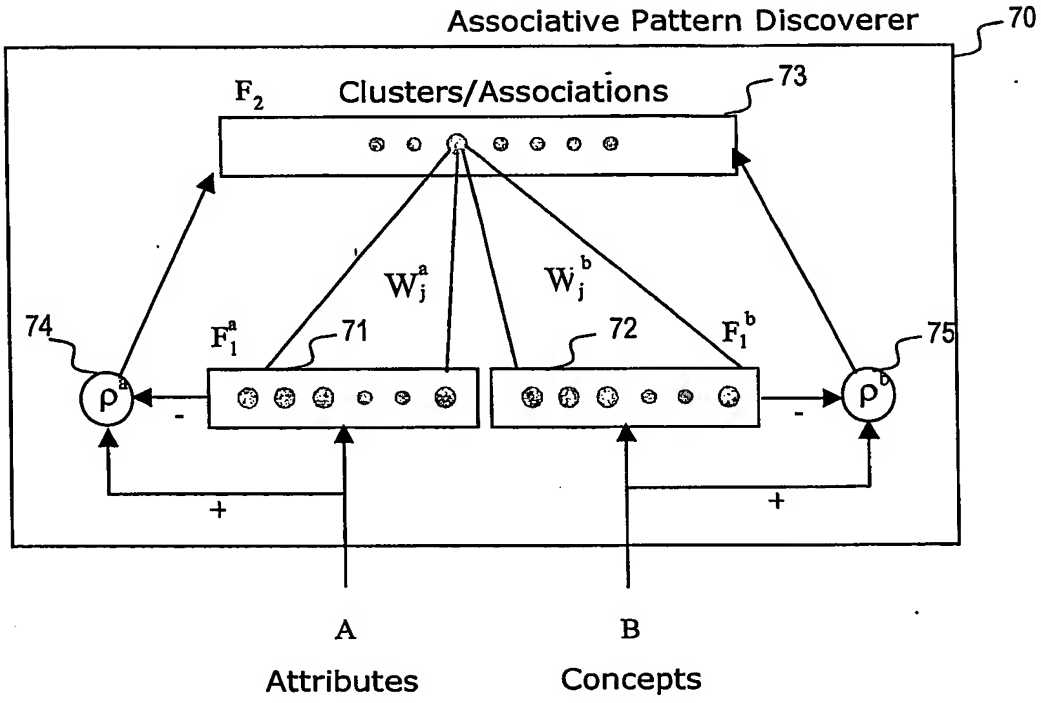

Associative Pattern Discoverer
70
F_2
Clusters/Associations
73
W_j^a
W_j^b
74
F_1^a
71
72
F_1^b
75
ρ^a
ρ^b
-
-
+
+
A
Attributes
B
Concepts

FIG. 4

Category choice: $T_j = \gamma \frac{|A \wedge W_j^a|}{\alpha^a + |W_j^a|} + (1-\gamma) \frac{|B \wedge W_j^b|}{\alpha^b + |W_j^b|}$

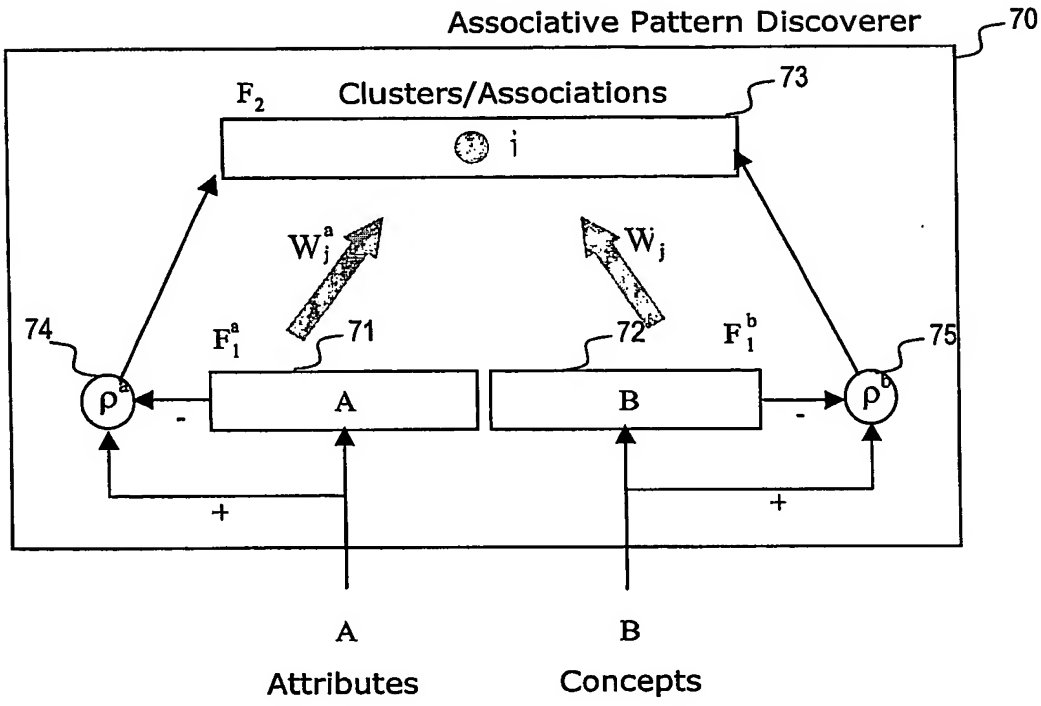


FIG. 5

Template learning

$$w_J^{a(new)} = (1-\beta^a) w_J^{a(old)} + \beta^a (A \wedge w_J^{a(old)})$$

$$w_J^{b(new)} = (1-\beta^b) w_J^{b(old)} + \beta^b (B \wedge w_J^{b(old)})$$

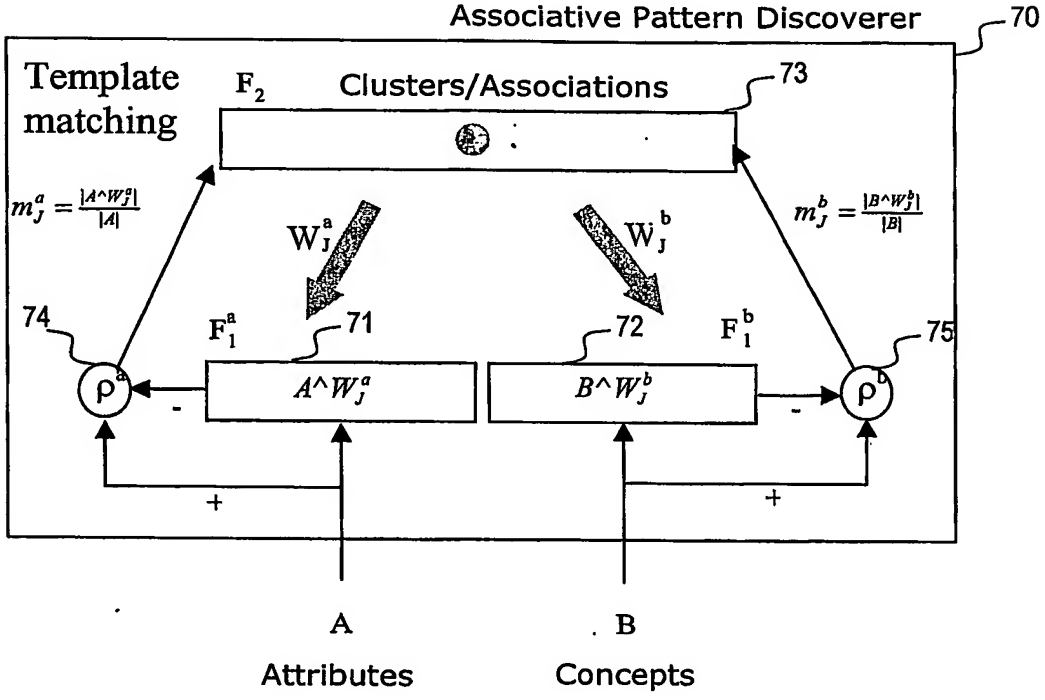


FIG. 6

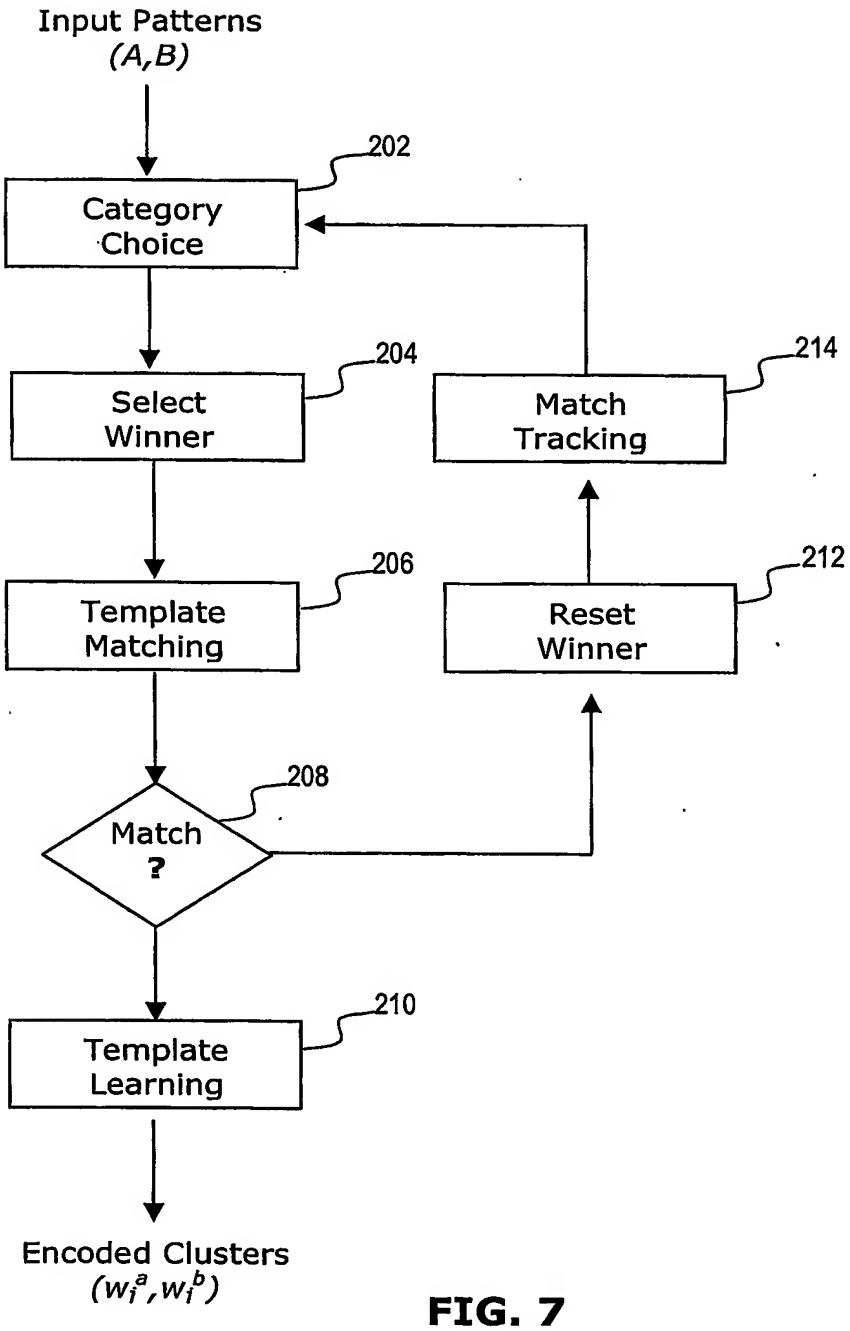

Input Patterns
(A,B)
202
Category Choice
204
Select Winner
214
Match Tracking
206
Template Matching
212
Reset Winner
208
Match ?
210
Template Learning
Encoded Clusters
(w_i^a, w_i^b)

FIG. 7

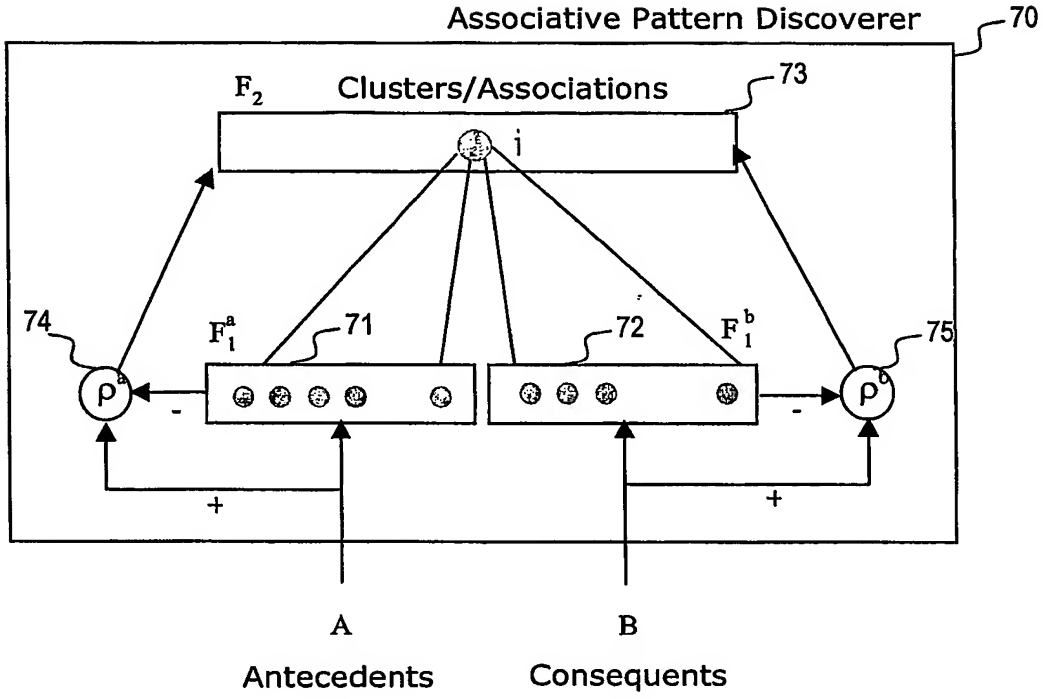

Associative Pattern Discoverer
70
F_2
Clusters/Associations
73
i
74
F_1^a
71
72
F_1^b
75
ρ^a
ρ^b
-
-
+
+
A
B
Antecedents
Consequents

FIG. 8

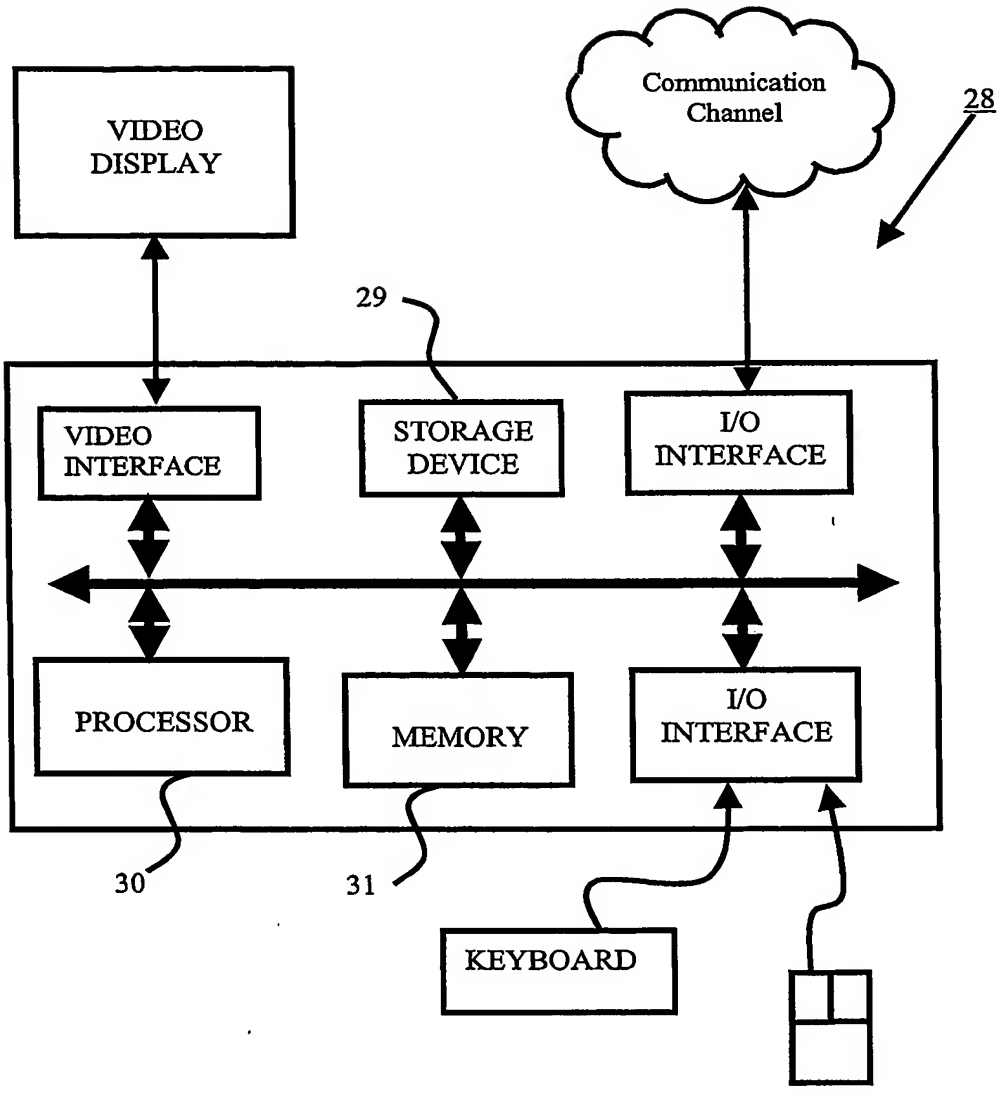

VIDEO DISPLAY
Communication Channel
28
29
VIDEO INTERFACE
STORAGE DEVICE
I/O INTERFACE
PROCESSOR
MEMORY
I/O INTERFACE
30
31
KEYBOARD

FIG. 9